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Whale Falls, Suspended Ground, and Extinctions Never Known

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Abstract This article contributes to work within extinction studies by asking how one might "story" extinctions of creatures that have been, and will remain, unknown. It grapples with losses that have been unrecorded, unmissed, and unrecognizable via the "lively ethography" approach to storying extinction. This approach, developed by Deborah Bird Rose and Thom van Dooren, seeks to draw readers into imaginative encounters with embodied, specific, and lively creatures to support situated ethical responses. While at first this approach might seem antithetical to exploring unknown extinctions, this article argues that it can provide an important stimulus for developing a situated approach to losses that are often thought of in terms of undifferentiated masses. The article's focus is on the recently discovered ecosystems of creatures that live on the remnants of dead whales on the sea floor, which are known as "whale falls." It reads these ecosystems via a notion of "suspended ground," which brings together philosopher Mick Smith's rethinking of an ethics of encounter with unknown soil extinctions and Stacy Alaimo's concept of "suspension." The article argues that engaging with ethographic writing from this perspective enables one to weave a more explicit account of the mysterious and the unknown into the approach.

Keywords extinction studies, blue humanities, oceans, environmental ethics, multispecies

In an influential article for *The Scientific American*, "The Last of the Great Whales," published in 1966, conservationist Scott McVay joined the chorus of concern about the future of great whales. He wrote that "only sharply reduced annual harvests and protective regulations that are both enforceable and enforced offer the possibility that the last of the great whales will survive."[1] Despite the strong feeling evident in the article, McVay's story of threatened extinction depended on abstract quantitative methods that have been questioned over their ability to communicate the complexities of extinction processes. Drawing on numbers, lists, and population counts, McVay marshaled together graphs of numbers of whales caught in units of thousands, catch records that fall off precipitously, and specimen illustrations drawn to scale. The result is that even

1. McVay, "The Last of the Great Whales," 21.

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while he celebrates cetaceans as one of the most diverse orders on earth, the variety of ecological networks that these whales participated in are not part of their extinction story. Instead the focus is on individual species and isolated representatives.

While McVay's approach to storying extinction is a familiar one, it and others like it have come under scrutiny within the environmental humanities from a number of different angles. Ursula Heise's *Imagining Extinction* has explored the literary form of the "extinction story,"[2] showing how these forms, such as tragedy, elegy, epic, and comedy, shape understandings of the nature/culture divide in a variety of problematic ways. Dolly Jørgensen has explored the trope of the "endling" and the mobilization of the "last of a species" to shape understandings of the extinction crisis as well as the way dominant extinction narratives have sought to reduce the uncertainty around "the last" to secure a decision around species absence.[3] Extinction stories arising from within de-extinction efforts have also been challenged, and read in various ways including as "narcissistic attachments" or charismatic fantasies.[4] Work in "spectral geographies" has been particularly fruitful, with an interest in how processes of extirpation and extinction produce ghostly landscapes of haunting and absence.[5]

This article arises from my involvement in the Extinction Studies Working Group, which has largely approached the storying of extinction via a further approach, that of "lively ethography."[6] Thom van Dooren and Deborah Bird Rose have described this as "an approach grounded in an attentiveness to the evolving ways of life (or *ēthea*; singular: *ethos*) [hence *ethography*] of diverse forms of human and nonhuman life and in an effort to explore and perhaps restory the relationships that constitute and nourish them."[7] Here the emphasis has been on the need for a storytelling that foregrounds the involvements species have in complex, relational forms of life. This approach seeks to draw readers into imaginative encounters with embodied, specific, and lively creatures to support situated ethical responses.[8] In this article, I explore this mode of storytelling by approaching the processes of loss that inspired the "save the whale" movement from a more relational perspective. Understandings of whaling as a process that has impacted wide webs of multispecies relationships have been increasing.[9] As just one example, researchers have linked the sequential collapse of megafauna populations in the North Pacific, such as seals, sea lions, and sea otters, to orcas "fishing down" the food web after massive reductions in whale numbers.[10]

2. Heise, *Imagining Extinction*.

3. Jørgensen, "Endling"; Jørgensen, "Presence of Absence."

4. Thew, "Narcissistic Attachments"; Lorimer, "On Auks and Awkwardness."

5. Garlick, "Cultural Geographies of Extinction"; Ginn, "Death, Absence, and Afterlife"; McCorristine and Adams, "Ghost Species."

6. Van Dooren and Rose, "Lively Ethography."

7. Van Dooren and Rose, "Lively Ethography," 77.

8. Rose, "Slowly"; van Dooren, *Flight Ways*.

9. Roman et al., "Whales as Marine Ecosystem Engineers."

10. Springer et al., "Sequential Megafaunal Collapse in the North Pacific Ocean."

My particular interest is in tracing less visible vestiges by focusing on the deep-sea consequences of industrial whaling. I look at the recently discovered ecosystems of creatures that live on the remnants of dead whales on the sea floor, known as whale falls. Biologists have suggested that the mass removal of whale carcasses during recent centuries of whaling may have had devastating effects on these communities.[11] However, knowledge of their unraveling remains speculative, for reasons I will explain below. What does seem clear though is that, in all likelihood, these ecosystems have been the site of the first anthropogenic extinction in the deep sea due to the loss of habitat caused by significantly reduced numbers of "falling" whales. The difficulty in determining who or what these extinct creatures might have been creates a troubling "unknown extinction." Unlike many of the creatures discussed in the works cited above, the unknowability of these extinctions does not consist of uncertainties over whether known species have really been lost, as in the recurrent sightings of the Tasmanian tiger, but something else. These extinctions are of those often described in the literature as "unrecorded," "unmissed," "unrecognisable," "unremarked," and as a "void" that stretches beyond what we might classify as "absent."[12]

Whale falls thus pose particular questions for the lively approach to storying extinction. In this case the ability to center embodied or imaginative encounters that draw on specific knowledge of the creatures affected is likely to be impossible. Yet central to the ethographic approach are notions of encounter, recognition, and detailed knowledge, not just for creating the extinction story, but—crucially—for developing a "shared ground" as the basis of the ethical import of these stories—aspects that I will discuss in more detail below. This article thus represents my efforts to wrestle with the problem of whether unknown extinctions can be storied from within this frame. If "each ethos is also a style or way of being and becoming *with others*,"[13] then can we tell ethical stories of becoming with the unknown and unrecognizable? To move toward an answer to this question, I first unpack the ethographical approach, with a particular emphasis on the importance of "shared ground" in Rose's and van Dooren's work. I then tell my own story of being drawn to whale-fall ecosystems and what I have found so far. I particularly highlight instances where "shared ground" seems impossible to conjure.

Emphasizing the absence of knowledge at the heart of this story, I turn to Stacy Alaimo's account of "suspension" to unpack the ethical challenges offered by the limits to knowledge intrinsic to life within the deep sea.[14] However, mobilizing the notion of "unloved others,"[15] I also highlight an important mode of co-opting "suspension" whereby unknown extinctions are storied in terms of lost resources. Returning then to

11. Butman, Carlton, and Palumbi, "Whales Don't Fall Like Snow."

12. McCorristine and Adams, "Ghost Species," 107; van Dooren, *Flight Ways*, 7; Meier, Frers, and Sigvardsdotter, "The Importance of Absence," 426.

13. Van Dooren and Rose, "Lively Ethography," 80.

14. Alaimo, "States of Suspension."

15. Rose and van Dooren, introduction.

the problem of shared ground, I suggest a correlate notion of "suspended ground." This notion brings together philosopher Mick Smith's rethinking of an ethics of encounter in relation to unknown soil extinctions[16] and Stacy Alaimo's concept of "suspension" to see how the ethographic approach might be understood as open to encounters with what we might awkwardly call the unencounterable. Remembering that Rose argued to "write into unmaking is a performative practice that calls for multiple strategies,"[17] I conclude by suggesting a situated unknowing that foregrounds the role of the unknowable within the ecological animism underpinning lively ethographies, and that helps us to weave this into the approach more explicitly so that the shifting and unsettling nature of shared ground can come to the fore.

Extinction Ethographies

As philosopher James Hatley writes, the idiom available for speaking about deep concerns over the survival of fellow earth beings "all too often proves itself to be antiseptic and distant. "Extinction" is the word one uses when one discusses policies and lists, when one determines dates and definitions."[18] Not only does this language fail to capture the significance of the loss of a species, it also fails to bring to light the relational forms of life that made the species possible. As Rose, van Dooren, and Matthew Chrulew write in their introduction to *Extinction Studies: Stories of Time, Death, and Generations*, "while charismatic endangered species occasionally grab a headline or two, all around us a quieter systemic process of loss is relentlessly ticking on."[19] They argue that extinction must be set within a multispecies framework where the focus is "on understanding and responding to processes of collective death, where not just individual organisms, but entire ways and forms of life, are at stake."[20] Key to the approach, then, is moving away from the notion of an extinction event that takes place upon the death of the last individual and toward extinction as a longer, drawn-out process that affects many other living forms.[21]

A second concern has been how to tell these stories in ways that move readers beyond what Rose has characterized as an "ethical paralysis that is invading our lives,"[22] drawing them instead into ethical responsibility. The emphasis on raising awareness of the particularities involved in extinction processes forms one aspect of this. As van Dooren writes, inasmuch as this approach helps to "thicken" our understandings of other creatures' lifeways, this increase in knowledge can potentially draw "us into new kinds of relationships and, as a result, new accountabilities to others."[23] That is, the

16. Smith, "Dis(Appearance)."
17. Rose, "Slowly," 9.
18. Hatley, "Walking with Ōkami," 26.
19. Rose, van Dooren, and Chrulew, *Extinction Studies*, 1.
20. Rose, van Dooren, and Chrulew, *Extinction Studies*, 5.
21. Van Dooren, *Flight Ways*, 12.
22. Rose, "Slowly," 2.
23. Van Dooren, *Flight Ways*, 9.

aim is to expose "readers to their lives and deaths in a way that might give rise to genuine care and concern."[24] Another aspect, emphasized particularly in Rose's work, is the importance to the story of situated and embodied encounters. Drawing on a Levinasian framework that centers on the face-to-face, she suggests that ethical understanding comes not from concepts shared in an abstract way, but from stories that offer "events to be participated in and shared, imaginatively and otherwise."[25] Bringing both of these lines of thought together, van Dooren and Rose write "ethographic storytelling is about responding to others as we encounter them in the richness of their own stories."[26] So alongside the shift from extinction event to extinction as process, are shifts from abstract concepts to embodied encounters.

In my own efforts within this area, I have been particularly inspired by Rose's account of the ethics of writing in a time of extinctions in her article "Slowly ~ Writing into the Anthropocene." In it she states that "unmaking is going on all around us these days" and asks "what a scholarly writer might do in the face of all this anthropogenic disaster."[27] Rose argues that resisting this unmaking involves resisting the kinds of thinking fostered by modernity. Referencing Aldo Leopold and Alf Hornberg, Rose writes "if it takes a mountain to think long-term connectivity, it takes modernity to think of a mountain as a gravel pit, and to haul it away piece by broken piece."[28] She argues that the logic of the fragmented gravel pit undermines understandings of connectivity and mutuality, causing "such separation and isolation that the ground for ethics appears to be broken."[29] Challenging these processes, Rose urges us to think relationally and ethically, by "living in the present temporalities, localities, and relationalities of our actual lives."[30]

For Rose, this situatedness is important for telling extinction stories that encourage ethical responsibility because "ethics are situated in bodies, in time, in place and, *necessarily*, in encounter" (my emphasis).[31] For example, in "Slowly" she discusses an encounter with dingoes who had been killed and hung up for display in a tree just outside of Canberra. Wanting to respond openly to the horror called forth by this experience, she reflects on her efforts to develop a "slow writing" approach that could show a fidelity to this specific embodied encounter and that later became manifest in *Wild Dog Dreaming*.[32] Central to this work therefore is an effort to rebuild a sense of shared ground on which ethical relations might be built, itself based on situatedness, encounter,

24. Van Dooren, *Flight Ways*, 9
25. Rose, "Slowly," 9.
26. Van Dooren and Rose, "Lively Ethography," 90.
27. Rose, "Slowly," 2, 3.
28. Rose, "Slowly," 3.
29. Rose, "Slowly," 6.
30. Rose, "Slowly," 6.
31. Rose, "Slowly," 6.
32. Rose, *Wild Dog Dreaming*.

mutual recognition, openness, and a coming together to create what Rose has elsewhere called "a community of recognition, a community of persons."[33]

A key tension for me, however, has been between wanting to maintain a fidelity to my own encounters with Rose's work, while at the same time working within contexts where the creatures I am researching are rarely encountered by humans, if ever. If encounter is necessary to ethics, if communities are built through mutual recognition, and if a relational ethics are based, in part, on knowing more, then how might we write ethically about the unencounterable? In my previous work on leatherback turtles, although I started out with an assumption that they must always live very far from me, I was astonished to find evidence of a leatherback sighting in the Forth of Firth, just offshore from a local Edinburgh beach, where I now live.[34] I suggested that this realization enabled a specific everyday connection with these seemingly exotic creatures that might be imaginatively inhabited. That is, I had found, against all expectation, that both it and I had made our lifeways within closely related places. A not-quite-physical encounter, but perhaps the beginnings of a feeling of a shared Earth and thus a kind of interdependence that Rose argues "brings us into domains of responsibility, accountability, proximity, ethics, and community."[35] Indeed a range of leatherback conservation programs question the notion that they are animals from a far-off elsewhere. Instead, groups such as the Canadian Sea Turtle Network, try to help their compatriots see leatherbacks as a "Canadian animal" to encourage feelings of responsibility, care and kinship.[36]

In the work I have done so far on whale falls, however, there has been a much more profound absence, and this article represents my efforts to think through the significance of encounter for storying extinction when confronted with extinctions that can never be known. Even so, in keeping with Rose's emphasis on connectivity with our actual lives, I want to share how I came to start looking into the topic. How we are brought to telling a particular story is a common theme in extinction studies approaches, but not all are as immediate as Rose's encounter with hunted dingoes. Hatley for instance has described his experience of first scanning through a list of extinct species in Japan, reflecting that "extinction has become so endemic to our time that choosing (as if choice where the modality by which these responsibilities are to be fulfilled!) which lost species should be remembered, which one or ones should find a place in one's thoughts, has been rendered increasingly arbitrary."[37] For me, it starts with a newspaper article.

33. Rose, "Connectivity Thinking, Animism, and the Pursuit of Liveliness," 506.

34. Bastian, "Encountering Leatherbacks."

35. Rose, "Connectivity Thinking, Animism, and the Pursuit of Liveliness," 495.

36. See, for example, their website, which emphasizes the home Canadian waters provide for "tropical turtles." Canadian Sea Turtle Network, seaturtle.ca.

37. Hatley, "Walking with Ōkami," 32.

Finding Whale Falls

In December 2014, George Monbiot wrote a piece on "Why Whale Poo Matters" for the *Guardian* with the subtitle, "Not only does nutrient-rich whale poo help reverse the effects of climate change—it's a remarkable example that nothing in the natural world occurs in isolation."[38] He focused on the trophic cascades arising from the release of large fecal plumes at the ocean's surface. These fertilize plant plankton, which itself then feeds krill and fish, themselves the key food groups for other larger animals. While reading it I couldn't help wondering what might have been happening deeper under the surface. Would these plumes have travelled down the water column in any way? Would the massive depletion of whale populations have an effect on creatures living below? More specifically, might there have been a series of extinctions of deep-sea creatures due to the loss of whales without us knowing? What would this mean?

I would randomly ask people about this until nearly two years later I found myself on a small boat in a Swedish fjord. I was part of a group of environmental humanities scholars and marine scientists brought together to talk about sea and society, and finally I got to pose my question to someone who might have an answer. A scientist from the University of Gothenburg immediately answered, "whale falls," and directed me to his colleague, a taxonomist who had a particular interest in deep-sea fauna. Sitting in a hotel room in Gothenburg, preparing for a meeting with this colleague, I read Craig R. Smith and Amy Baco's article "Ecology of Whale Falls at the Deep-Sea Floor," and found the following speculation: "both whale-fall specialists and some more generalised components of reducing-habitat faunas may have been driven to extinction due to massive loss of whale-fall habitats over the past 200 yr."[39] So here I was, brought vicariously to an extinction story, via random curiosity, chance meetings, interdisciplinary efforts to build connections across isolated disciplines, and the political economies of new environmental humanities programs that funded these networking possibilities. Having found an answer, a more difficult problem then immediately presented itself. What shared ground might there be to develop understandings of ethics, responsibility and connection in response to these speculative losses?

Falling Whales

Whale-fall ecologies are a relatively new area of marine research, first discovered in 1987,[40] although as Smith and Baco note there had been earlier speculations. They mention August Krogh, who spoke to delegates at the Century of Progress Exposition in Chicago on the "Conditions of Life at Great Depths in the Ocean" in 1933. At the outset Krogh confessed to the delegates "that I know nothing about it, that I have to offer only

38. Monbiot, "Why Whale Poo Matters."
39. Smith and Baco, "Ecology of Whale Falls at the Deep-Sea Floor," 332.
40. Smith et al., "Whale-Fall Ecosystems," 572.

more or less vague suggestions."[41] Nonetheless he was willing to propose that to understand the possibilities of life on the ocean floor, we must understand what potential food sources might be available. Crucially, he challenged the neglect of study of the kind of cascades I had being wondering about, noting that "the excreta and dead bodies of larger animals do not appear to have been seriously considered as food of the bottom fauna."[42] Fifty or so years later oceanographer Craig Smith and his team were able to announce in *Nature* that through the use of a deep submergence research vessel off the coast of California they had discovered a decomposing carcass of a fin or blue whale which had "produced a microhabitat distinct from the surrounding . . . basin floor."[43] By 2003 Smith and Amy Baco were able to claim that "despite being one of the least-studied deep-sea reducing habitats, whale falls may harbour the highest levels of global species richness; thus far, 407 species are known from whale falls."[44] In the most recent review from 2015, Smith et al. write that "deep-sea whale-fall studies are yielding new species at an accelerating rate and producing exciting discoveries of evolutionary and functional novelties."[45] Even so they claim that "we are still in the early stages of discovery of the deep-sea whale-fall fauna."[46] So unlike the experiences of many of my extinction studies colleagues who have studied sites of devastating loss, we are initially led into scientific communities that are astounded and excited by the great variety of new life they are discovering.

Still, at the same time as one is met by the taxonomic riches of these newly discovered "reducing environments," trying to determine the aftereffects of whaling is also a key task. As Joe Roman et al. point out, "whale falls influence the deep-sea floor in a manner analogous to tree falls in forests, by altering local food availability, providing habitat structure, and supporting diverse biotic assemblages."[47] Given the strong effects that whale falls have on these communities, the massive depletion of whales—with estimates of losses of between 66 percent and 90 percent of populations[48]—suggest that with this loss of habitat "some specialized whale-fall species probably went extinct as a result of commercial whaling."[49] When some questioned the significance of whale falls for deep sea ecosytems,[50] Butman and her colleagues responded somewhat acerbically, "we conclude that millions of falling whales . . . are not casually removed from the deep sea without a detectable impact on the animals that have come to rely on them as

41. Krogh, "Conditions of Life at Great Depths in the Ocean," 430.
42. Krogh, "Conditions of Life at Great Depths in the Ocean," 433.
43. Smith et al., "Vent Fauna on Whale Remains," 27.
44. Smith and Baco, "Ecology of Whale Falls at the Deep-Sea Floor," 329.
45. Smith et al., "Whale-Fall Ecosystems," 578.
46. Smith et al., "Whale-Fall Ecosystems," 578.
47. Roman et al., "Whales as Marine Ecosystem Engineers," 381.
48. Roman et al., "Whales as Marine Ecosystem Engineers," 377.
49. Roman et al., "Whales as Marine Ecosystem Engineers," 382.
50. Jelmert and Oppen-Berntsen, "Whaling and Deep-Sea Biodiversity."

a critical resource over evolutionary time."[51] While many references to extinction in the literature have been speculative, Roman et al.,[52] and more recently Smith, Roman, and J. B. Nation,[53] use metapopulation modeling to suggest more concretely that species that were less common (i.e., ones that were found [at minimum] in less than 80 percent of whale-fall habitats) will now have been lost because the number of whale falls will not have been enough to sustain them.[54] These extinctions may also have rippled out to other deep sea communities, particularly those populating hydrothermal vents and seeps through the "loss of whale skeleton stepping stones."[55] Thus even while the discovery of whale falls has led to a richer account of the great variety of ways that lives are made on our shared planet, our understandings of the great unmaking and unraveling have become more multidimensional as well.

As mentioned above, researchers working on whale-fall ecosystems have claimed that these proposed extinctions may be "the first anthropogenic species extinctions in the deep sea."[56] While extinction stories that focus on lasts or firsts can be problematic—for example the notion of endlings or the "firsts" hoped for from de-extinctions[57]—this particular first marks a significant expansion in reach of the processes producing the sixth mass extinction. Further, far from adhering to the punctuating temporality of the death of the last or the cloning of a first, this deep-sea extinction process epitomizes what van Dooren has termed the "dull edge of extinction."[58] Indeed, the process of breaking down the remains of great whales does not happen quickly. Four successional stages have been identified, where the whale is first broken down by scavengers eating the soft tissue, then opportunist polychaetes (bristle worms) and crustaceans eat the "fallout" from this process. When the whale is reduced primarily to bones, there is a sulfophilic stage where creatures such as *Osedax*, also known as snot worms or bone worms, participate with their internal symbionts in anaerobic microbial decomposition. Finally, there is a "reef stage" where the hardened remains are used by suspension feeders.[59] This entire process is thought to last for up to ninety years, with the sulfophilic stage in particular lasting for between forty and eighty years.[60]

Like the light from stars, showing us the past rather than the present, whale falls travel through time, continuing to enact the consequences of unfettered industrial whaling and complicating what might actually be meant by Rose's "present temporalities" of

51. Butman, Carlton, and Palumbi, "Whales Don't Fall Like Snow," 656.
52. Roman et al., "Whales as Marine Ecosystem Engineers."
53. Smith, Roman, and Nation, "A Metapopulation Model for Whale-Fall Specialists."
54. Roman et al., "Whales as Marine Ecosystem Engineers," 382.
55. Butman, Carlton, and Palumbi, "Whaling Effects on Deep-Sea Biodiversity," 463.
56. Smith et al., "Whale-Fall Ecosystems," 575.
57. Jørgensen, "Endling"; van Dooren and Rose, "Keeping Faith with the Dead."
58. Van Dooren, *Flight Ways*, 13.
59. Smith, "Bigger Is Better," 288.
60. Smith, "Bigger Is Better," 288–91.

our lives. The various successional stages of whale falls and their "different persistence times" create "time lags,"[61] or what are more ominously known as "extinction debts."[62] These lags are produced due to the diachronic nature of the decomposition of whale remains, where each successional stage is affected at different times.[63] Communities toward the later stages of the process may not feel the full effects of the loss of habitat from whaling until many years after the last whale has fallen. Moreover, given that whaling varied globally in terms of timescale and intensity, this loss of habitat will not have occurred simultaneously across the earth's oceans. The implication here is that "regional asynchrony in the extermination of great whales suggests that ocean basins may be in different phases of whale-fall habitat loss and species extinction."[64] Extinctions are most likely "in regions such as the North Atlantic, where great-whale populations . . . have been depleted or extinct for >100 y."[65] Here the extinction debts are said to be most likely to be "realized."[66] However, extinction processes set in train by whaling "may be ongoing in the Southern Ocean and northeast Pacific, where intense whaling occurred into the 1960's and 1970's."[67] Writing around a decade ago, Smith claimed that in some cases "whale-fall specialists may only now be approaching their greatest habitat loss, potentially causing species extinctions to be occurring at their highest historical rates."[68] Proposals for urgently investigating whale-fall communities in these areas are thus a high priority for researchers.[69]

As Stacy Alaimo writes, there is a "persistent (and convenient) conception of the ocean as so vast and powerful that anything dumped into it will be dispersed into oblivion."[70] Whaling demonstrates the flip side of this idea—that the vast power of the ocean means that no matter how much is taken out of it, it can always be replenished. Alongside more widely known reductions in fish, sea mammals and plant life resulting from whaling, the pressures on whale-fall ecologies speak to the contrary. Instead they point to the intricate processes of collective death that have occurred due to the industrial-level removals of whales. As Craig Smith (pers. comm., June 26, 2019) suggests, part of the fascination of these ecosystems is the way they "highlight unexpected risks to biodiversity posed by human extractive activities in the ocean." Importantly, they do this in a context where the prospect of a return to whaling is never far away. Jelmert and

61. Smith, "Bigger Is Better," 296.
62. Smith, Roman, and Nation, "A Metapopulation Model for Whale-Fall Specialists."
63. Smith, "Bigger Is Better," 286.
64. Smith, "Bigger Is Better," 297.
65. Smith, Roman, and Nation, "A Metapopulation Model for Whale-Fall Specialists," 2.
66. Smith, Roman, and Nation, "A Metapopulation Model for Whale-Fall Specialists," 2.
67. Smith, "Bigger Is Better" 286; see also Roman et al., "Whales as Marine Ecosystem Engineers," 382.
68. Smith, "Bigger Is Better," 297.
69. Smith et al., "Whale-Fall Ecosystems," 589.
70. Alaimo, "States of Suspension," 477.

Oppen-Berntsen's objections to the idea that whales have significant effects on the biodiversity of the deep sea, for example, were couched in terms of warding off scientific objections to a resumption of whaling.[71] Indeed the conclusions of Smith et al.'s recent modeling of extinction risks—some two decades later—continue to be framed in terms of how to minimize the impact on these ecosystems should this resumption occur. Their findings suggest that whale-fall specialists are likely to be "highly dependent on the evolution and widespread occurrence of very large whales,"[72] the same whales that have been the key targets for whalers. Indeed the very area where the extinction debts incurred by whaling may still be playing out—the Southern Ocean—is also one that historically had the highest "abundance of very large whale species over evolutionary time scales" and thus is potentially the area most "likely to have developed the greatest diversity of whale-fall specialists."[73] Tragically it is also the area where the study has found that extinction pressures are most extreme since whale populations remain particularly low.[74] Even so there continue to be calls to reopen the area for exploitation.

Collectively this research enables us to assert that extinctions have occurred and are currently occurring within whale-fall ecologies. However, I have not been able to discuss the specific creatures affected in detail. It has been suggested that the extinct species in question are less likely to be specialist scavengers—since these are usually able to eat a range of resources—and more likely to be in the sulphophilic and opportunist stages (Craig Smith, pers. comm., June 26, 2019). While this narrows things down a little, it is still not much to go on for an ethography of the sort that van Dooren and Rose have championed. I am unable, for example, to "invite readers into a sense of curiosity about the intimate particularities of others' ways of life: how they hunt or reproduce, how they relate to and make sense of (or 'story') their particular place, how they entice pollinators or throw their spores to the wind."[75] Instead the shadows of lost creatures have been conjured into our awareness through processes of mathematical modeling that greet the uninitiated with intimidating squiggles across the pages of scientific articles. Perhaps the intricacies of *Osedax* life cycles could provide a ready proxy, but then maybe we would be missing something entirely distinctive. The recognition that is central to the ecological animism underpinning the ethographical approach is not possible in any straightforward way here.[76] Thus rather than a shared ground, we are brought into a state of not knowing. The work of the rest of this article will be to explore this seeming impasse.

71. Jelmert and Oppen-Berntsen, "Whaling and Deep-Sea Biodiversity," 654.
72. Smith, Roman, and Nation, "A Metapopulation Model for Whale-Fall Specialists," 14.
73. Smith, Roman, and Nation, "A Metapopulation Model for Whale-Fall Specialists," 14.
74. Smith, Roman, and Nation, "A Metapopulation Model for Whale-Fall Specialists," 12.
75. Van Dooren and Rose, "Lively Ethography," 86.
76. Van Dooren and Rose, "Lively Ethography," 82.

Suspension

With the increasing interest in thinking more critically about the oceans within the humanities and social sciences, a wide range of scholars have explored how the oceans threaten, rework and re-form Western conceptual frameworks through the different ontologies they offer.[77] Given our interests here in multispecies interrelationality and responsibilities that occur beyond knowledge and encounter, Stacy Alaimo's account of a transcorporeal ethics thought through the deep sea is particularly useful. In her essay "States of Suspension: Trans-corporeality at Sea," Alaimo emphasizes the need to develop "modes of knowing, being, and acting" that extend posthumanist approaches "across the vast, liquid, and barely known expanses of the seas."[78] While the ethographical approach has situated itself more clearly within a philosophical animist framework than a posthumanist one,[79] Alaimo's call is still a relevant one for us here. That the first anthropogenic extinction within the deep sea is one we are not able to know about with any certainty, itself issues a call to revisit the emphasis on deeper knowledge of the other seen in lively approaches to storying extinction. For Alaimo, rather than suggesting an absence of ethical encounter, the alienated conception of the ocean found within Western frameworks has the potential to be transformed into a challenge to humanist frameworks that Rose has criticized for fostering "the illusion of mastery and control."[80] So while the unknown character of the deep sea might seem to separate out humans from ethical connection with it, Alaimo argues that "it may also suggest that sea life hovers at the very limits of what terrestrial humans can comprehend."[81] One consequence of these limits "may be an epistemological-ethical moment that debars us from humanist privilege."[82] Playing on the definition of suspension, as a taking away of privilege, a state of indetermination, as well as a feeling of awe, she argues that this debarring from privilege instead potentially "keeps us 'fixed or lost as in wonder or contemplation.'"[83] Might an ethics of storying the unencounterable rest on this capture in the mode of suspension, rather than a capture by the direct encounter, as with Rose's experience with dingoes?

In more recent work, Alaimo has discussed the contributions of unknown extinctions to the process of being put in suspension, or "under pressure."[84] Indeed discussing the very kinds of deep-sea extinctions I have begun to unpack here, she writes that "the not-yet-nor-never-to-be-discovered marine species that (must) have become extinct due to anthropogenic causes—which elude capture by human knowledge systems but

77. Deloughrey, "Submarine Futures of the Anthropocene," 37.
78. Alaimo, "States of Suspension," 489.
79. Rose, "Val Plumwood's Philosophical Animism."
80. Rose, "Connectivity Thinking, Animism, and the Pursuit of Liveliness," 495.
81. Alaimo, "States of Suspension," 477.
82. Alaimo, "States of Suspension," 477.
83. Alaimo, "States of Suspension," 477.
84. Alaimo, "The Anthropocene at Sea."

nonetheless cannot elude the unintended effects of human actions—would be apt icons for the Anthropocene seas."[85] Imagined in particular ways, these "icons" could signal the ways that "human knowledge is not adequate to account for, nor certainly to ameliorate, the enormity of the effects of a geological epoch distinguished by anthropogenic consequences."[86] This challenge to fragmentation, with an emphasis on the transcorporeal connectivity that underpins the wide-ranging nature of these "unintended" effects, resonates with Rose's skepticism of the types of thinking fostered by modernity. However, for our purposes the way in which these figures might be imagined needs to be approached cautiously. This is because, like the selectivity of known extinctions that have been critiqued for the lack of attention to the "unloved others" that are sidelined in stories of individual charismatic species loss,[87] among unknown extinctions there are also some that are loved more than others.

The possibility of unknown astrobiological species, for example, has generated intricate protocols for attempting to avoid "forward contamination" during space exploration that might lead to their extinction.[88] This includes plans for "planetary protection" in the face of risks of "planetary cross-contamination."[89] Other research in "deep fluids" or ancient water reservoirs, which often works as a proxy for modeling the potential for finding life on Mars, has also heightened awareness about wiping out species on contact.[90] Perhaps better known have been calls to halt the loss of the Amazon rain forest, on the grounds that we cannot know what kinds of plants, insects or animals we might be losing. Many of these calls are framed in terms of the potential uses for humans that are being lost, such as the possibility of a cure for cancer. This move can also be found in research on whale falls. However, far from the lofty goal of curing significant diseases, in an effort to demonstrate the economic potential of preserving these ecosystems the articles I have read so far can end up awkwardly talking about whale-fall bacteria as "a novel source of cold-adapted enzymes of potential utility in cold-water detergents."[91] What this suggests is that the fact of the failure of human knowledge in the face of unknown extinctions does not reliably challenge humanist narratives of progress and economic success and the fragmentation they encourage.

In *The Mushroom at the End of the World*, a key focus of critique for Anna Tsing are notions of progress and the ways they narrow perceptions of what is significant. She writes that "dreams of modernization and progress" are frames that "sort out those

85. Alaimo, "The Anthropocene at Sea." 171.

86. Alaimo, "The Anthropocene at Sea." 171.

87. Rose and van Dooren, introduction.

88. Nicholson, Schuerger, and Race, "Migrating Microbes and Planetary Protection"; Rummel, "Planetary Exploration in the Time of Astrobiology."

89. Nicholson, Schuerger, and Race, "Migrating Microbes and Planetary Protection," 389.

90. Lollar et al., "New Frontiers for Deep Fluids and Geobiology Research."

91. Smith and Baco, "Ecology of Whale Falls at the Deep-Sea Floor," 311; see also Zeppilli et al., "Characteristics of Meiofauna in Extreme Marine Ecosystems."

parts of the present that might lead to the future. The rest are trivial: they 'drop out' of history."[92] From the examples discussed so far, it is possible to see these frames at work within unknown extinctions. Cancer cures and the discovery of alien life forms can be made to conform to these dreams, providing paths into progressive futures. The shadowy remains of the postulated deep-sea extinctions associated with industrial whaling, however, have so far been unloved unknowns that drop out of progressive time. They only seem able to enter it inasmuch as they are able to conform to the kind of thinking Rose described as "thinking 'like a mountain about to be broken down into gravel.'"[93] Only in this case we find "thinking like bacteria about to be broken down into laundry detergent," creating a kind of terrible symmetry with the whales that provide their ecosystems who were themselves broken down into soap. Within the suspension, then, it is important to remember that some unknown extinctions are made to matter more than others. The problem of how to recognize whale-fall ecosystems beyond the instrumental, and also the responsibilities arising from this first anthropogenic extinction in the deep sea, remains a significant challenge. Thus I want to return to the problem of "shared ground" advocated by Rose via the work of philosopher Mick Smith to move between earth and sea, and toward what we might call a "suspended ground."

Grounds of Fellow Feeling

In his article "Dis(Appearance): Earth, Ethics and Apparently (In)Significant Others," Smith grapples with the problem of creatures who do not appear to us, and the conflict this creates with many of the ethical theories available for thinking through extinction within a Western context. Reflecting on something much closer to our everyday lives than the deep sea, namely the microscopic lives lived out in the soil, Smith notes that here too we are met with an ignorance and unknowability that is astonishing. As he notes, conservation biologists do not track endangered microbial species, and none are present on lists of known extinctions.[94] Even so, with the rapid loss of top soils and changes in agricultural techniques, he claims that "many soil inhabiting species are almost certainly becoming extinct before we even learn of their existence."[95] As a result, and as we saw in the case of whale-fall extinctions, "to the extent that they do not appear as constituents of our world it might seem impossible to concern ourselves with them instrumentally, let alone ethically."[96] What follows is a fascinating effort by Smith to continue to emphasize the significance of knowing encounters for eliciting concerned responses, while also showing how the encounter brings with it an excessiveness that can lead to ethical responses that go beyond the face-to-face itself.

92. Tsing, *The Mushroom at the End of the World*, 20.
93. Rose, "Slowly," 5.
94. Smith, "Dis(Appearance)," 23.
95. Smith, "Dis(Appearance)," 24.
96. Smith, "Dis(Appearance)," 25.

For Smith, retaining the moment of encounter in our everyday lives is necessary, as it is for Rose, and he emphasizes, in conversation with Max Scheler and Emmanuel Levinas, that beings become "morally significant" not because of the identification of instrumental benefits (whale falls "the detergent edition") or an abstract frame that requires formally proving that these unloved unknowns fall within a preset category that counts as "significant" (e.g., as animate beings), but because of an experience of what Scheler calls "fellow feeling." This experience of feeling "noninstrumental concern for Others"—does start from a specific appearance of the other, however he notes that for Scheler in attending to feelings of ethical concern "we also open ourselves to other (potentially unlimited) ethical possibilities that flow within and can change the patterns of significance that constitute what matters to us."[97] Using the example of an imagined encounter with the last wild Lady's Slipper Orchid remaining in Britain, Smith notes the potential for an experience of being struck by the spectacle and beauty of the flower but suggests that for Scheler, there is then also the possibility of experiencing the flower not only as distinct from us "but also as a being that is never fully comprehensible."[98] Delving into the suspension that remains part of the encounter with the orchid, he suggests we might learn more about rhizomes, mycorrhizal fungi, and the specificities of this soil community, and this landscape, that have enabled a continuing habitat for this particular orchid. This understanding need not be an instrumental one that is explored only to know what makes the orchid flower, but in a way that can "shift the patterns of our ethical responses and responsibilities more widely."[99] That is, Smith proposes that "ethics flows through the landscape as we attend to it. What had been, perhaps, a rather uninteresting rocky slope begins to take on new significance as we become open to wider possibilities of other aspects of this place and other members of this community appear in our world."[100] The specificity of encounter can thus potentially draw us into a more detailed knowing that expands our senses of ethical commitment, but in doing so it also suggests that others whom we cannot know "appear" in a certain sense as well.

Unpacking this idea a little further, Smith argues that putting Scheler into conversation with Levinas's conceptualization of the Other helps us to understand more clearly what might be meant by the claim that an ecological ethics centrally committed to the encounter does not remain only within the realm of direct appearance. This is because "there is a sense in which the Other always calls us out of the world with which we are familiar to insist that there is more, infinitely more, than initially appears to be the case, more than we know, see, or understand."[101] Under this account the ethical

97. Smith, "Dis(Appearance)," 28.
98. Smith, "Dis(Appearance)," 40.
99. Smith, "Dis(Appearance)," 40.
100. Smith, "Dis(Appearance)," 40.
101. Smith, "Dis(Appearance)," 35.

event becomes "the appearing significance of an Other that immediately transcends that appearance."[102] An ecological ethics in this case suggests that a community of mutualism and interdependence, must also always be a community that grounds itself within the recognition that "what appears to us is not all that appears."[103] As a result, and as Audra Mitchell argues, this "approach suggests that . . . one's response to concrete manifestations of extinction can tap into an intuitive ethical register that acknowledges and responds to the broader phenomenon without needing to apprehend it directly. This line of thinking might help to overcome the argument that extinction is 'too large,' 'unthinkable' and thus too unrelatable to engender meaningful collective human responses."[104] Responding adequately to processes of extinction may indeed start from the specifics of encounters, however, reading Rose's work (in particular) through Smith's suggests that the shared ground that Rose centers in her account is one that brings with it a suspension that escapes recognition and mutual knowing.

Suspended Ground

It is now possible to unpack what I am gesturing toward by the notion of "suspended ground" offered by the utterly incomplete story of the unknown extinctions associated with whale falls that I have sketched in this article. Their unknowability enacts a kind of suspension of the type that Alaimo talks about, an experience of being "'held in an undetermined or undecided state awaiting further information."[105] And yet, I would also suggest that they are not absolutely absent as Alaimo appears to suggest when describing the "not-yet-nor-never-to-be-discovered." That is rather than being "icons without images, names, or lineages. Countless creatures who will never appear within human frames,"[106] the account I have offered rewrites their loss as a situated one, a *situated* unknown extinction, grounded within specific processes of habitat loss and resource extraction, and thus with specific stories of benefit, loss, and responsibility that we must still unravel.[107] Just as Mick Smith's orchid might bring us toward concerns for soil microbes, might whale-fall ecosystems show us how the "the appearance of the [whale fall] Other shifts the ground on which we stand,"[108] drawing out concerns that are grounded in possibilities of embodied encounter but that turn explicitly toward the encounter's openness and mysteriousness. As Roman et al. point out "whales were once almost exclusively valued as goods to be removed from the

102. Smith, "Dis(Appearance)," 35.

103. Smith, "Dis(Appearance)," 42.

104. Mitchell, "Beyond Biodiversity and Species," 38.

105. *Merriam-Webster Dictionary*, quoted in Alaimo, "States of Suspension," 153.

106. Alaimo, "The Anthropocene at Sea," 154.

107. Here I am indebted to discussions with Thom van Dooren about situated uncertainties, something he has explored in *The Wake of Crows*, particularly chapter 5.

108. Smith, "Bigger is Better," 35.

ocean,"[109] but they also grew as the focus of "noninstrumental concern" leading to a shifted ground where what Mick Smith calls "the earthly percolation of ethical flows" might lead us from whales to poo to those feeding on sunken carcasses and the shadowy whale-fall specialists who might be just now passing through their most dangerous point of extinction crisis.

Storying extinction from a position of suspended ground thus helps us to create a shift in emphasis within lively ethographies to see how a "community of recognition" might open up a fellow feeling that fundamentally cannot be recognized. Such a shift would further help to bring the lively ethography approach into deeper conversation with the continental philosophical accounts that Rose and van Dooren draw on, via discussions of Levinas, Nancy, Derrida, and others, that are deeply suspicious of formulations of community that are tied to proximity, knowledge, recognition, and encounter. While I would not suggest that these discussions of community reproduce problematic accounts based solely on commonality—indeed far from it[110]—I am suggesting that in the effort to avoid the abstractions of modernity via a focus on embodied encounters, the excessiveness of community beyond encounter and knowledge appears to have become backgrounded.

Crucially, reconsidering ethographies of extinction from suspended ground can help sensitize us to the ways Rose and van Dooren's texts already make room for the unknown. While their suggested writing strategies center on particular embodied encounters, they also write that their commitment to an ecological animism "is the cultivation of a kind of openness towards the world," one where we do not "assume that we know, that we could know, all of the ways in which our world is lively and responsive."[111] Further, in "Slowly," while Rose emphasizes fidelity to the specific encounter, her conception of fidelity also "asserts that that which is here on earth not only exceeds human understanding but is pervasively mysterious. The term 'mysterious' provocatively acknowledges that an understanding of life on earth in its emerging fullness can never be totalised."[112] How might lively ethographies actively engage with the encounter's opening onto mysteriousness? Indeed if "the aim of lively ethographies [is] to seize our relational imagination,"[113] then mustn't this imagination also reach out into the suspension that relationality inevitably brings with it? Here I would suggest that Rick de Vos's careful work on birds of paradise and the loss of endemic species in Tasmania's Lake Pedder provides examples that already seek to draw us in this direction.[114] Further, while not explicitly thematized, van Dooren's most recent work calls attention to the extinctions of Hawaiian snails that will now never be known to Western science.[115]

109. Roman et al., "Whales as Marine Ecosystem Engineers."
110. Buchanan, "Precarious Communities."
111. Van Dooren and Rose, "Lively Ethography," 82–83.
112. Rose, "Slowly," 11.
113. Van Dooren and Rose, "Lively Ethography," 91.
114. De Vos, "Extinction in a Distant Land"; de Vos, "Inundation, Extinction, and Lacustrine Lives."
115. Van Dooren, "A World in a Shell."

Conclusion

Toward the end of work on this article, a colleague texted me one night with news that the discovery of a whale fall by the E/V Nautilus team was being live-streamed on Twitter. The curated event feed showcased excited scientists and members of the public transfixed by the variety of encounters, the abundance of life on the sea floor, and an octopus interacting with the camera supposedly challenging citizen science as a human-only affair.[116] Together with their appearance in the *Blue Planet II* episode "The Deep," and their ability to become inspiration for poets, artists, puppeteers, musicians, and others, whale falls have shown themselves to have the capacity to entrance and to wonder. However, these appearances have rarely—if ever—been accompanied by the recognition that these sites of newly discovered life are also the sites of newly discovered anthropogenic extinctions. This suggests that stories of unknown extinction have important work to do in raising awareness around the complex impacts of industrial whaling and what is at stake in current conservation efforts. As Cheryl Ann Butman and her colleagues argue, when examining the effects of whaling on deep-sea biodiversity, while conservation interest has been centered on issues where the "ecological consequences are at least partially known," such as habitat destruction and eutrophication, "the more subtle, human-mediated change in global ocean biodiversity due to the effects of whaling on deep-sea communities has potential ecological consequences that were and are entirely unknown. Such consequences may be complex indeed."[117]

And yet, unless these stories are told carefully, there is the particular risk of developing accounts, of the kind that Mitchell and Noah Theriault have criticized, where the distant and disconnected extinction story "normalizes the profound violences driving extinction, while cocooning its viewers in the secure space of the voyeur."[118] Thus, Rose's emphasis on "living in the present temporalities, localities, and relationalities of our actual lives" when trying to respond to extinction remains a powerful injunction for unknown extinctions, particularly in continuing to try to trace one's connections with, and responsibilities for, the processes causing these losses. The story I have begun here needs much more work, then, to continue to develop these links that would ground a responsive ethics through encounters with the unencounterable. Unknown extinctions thus not only challenge Western modernity's hubristic assumption that everything can be known but also ask us to enter deeply into the kind of ecological ethics that Mick Smith argues grounds itself in the recognition that "what appears to us is not all that appears."[119]

116. E/V Nautilus, "Marine researchers stumble upon a whale carcass during live-streamed deep-sea dive."

117. Butman, Carlton, and Palumbi, "Whaling Effects on Deep-Sea Biodiversity," 463.

118. Mitchell, "Decolonizing against Extinction."

119. Smith, "Dis(Appearance)," 42.

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